

1. A method of encoding a block of data to be provided to a data channel comprising:
receiving blocks of data in an unconstrained data stream; and
producing a constrained data stream to satisfy a code constraint of the data channel by
replacing code constraint violating bit sequences occurring in each data block with values that
5 form a linked list in such data block.
2. The method of claim 1 wherein the values include non-code-constraint-violating pointer
values.
- 10 3. The method of claim 2 wherein the replaced code constraint violating sequences of
bits include at least one type of violation of the code constraint.
4. The method of claim 3 wherein the code constraint includes a k constraint.
- 15 5. The method of claim 4 wherein the at least one type of code constraint violation
includes a pattern of all zeroes.
6. The method of claim 5 wherein the data blocks in the unconstrained data sequence
includes code constraint violating bit sequences comprises an all ones pattern, further
20 comprising:
eliminating the all ones pattern of code constraint violating bit sequences from each
data block using a $1/(1+D)$ precoder following the replacement of the all zeroes patterns with
the linked list.

7. The method of claim 5 wherein the data blocks in the unconstrained data sequence include code constraint violating bit sequences which include patterns of all ones and alternating ones and zeroes, further comprising:

eliminating the patterns of all ones and alternating ones and zeroes from each data block using a $1/(1+D^2)$ precoder following the replacement of the all zeroes patterns with the linked list.

8. The method of claim 3 wherein the at least one type of code constraint violation includes a pattern of all ones.

9. The method of claim 3 wherein the at least one type of code constraint violation includes a Nyquist pattern.

10. The method of claim 3 wherein the at least one type of code constraint violation includes code constraint violations that include a first pattern and a second pattern.

11. The method of claim 10 wherein each value further includes a flag to identify if the corresponding code violating bit sequence that such value replaces is the first pattern or the second pattern.

12. The method of claim 10 wherein replacing comprises:

replacing code constraint violating bit sequences having the first pattern with values that form a first linked list; and

replacing code constraint violating bit sequences having the second pattern with values that form a second linked list.

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13. The method of claim 12 wherein producing comprises:

prefixing a first sequence of bits in the data block with a first linked list head followed by a second linked list head, the first linked list head pointing to a first value in the first linked list and the second linked list head pointing to a first value in the second linked
10 list.

14. The method of claim 10 wherein replacing comprises:

replacing, in a first portion of the data block, code constraint violating bit sequences including the first and second patterns with values that form a first linked list; and

15 replacing, in a second portion of the data block, code constraint violating bit sequence including the first and second patterns with values that form a second linked list.

15. The method of claim 10 wherein the first pattern corresponds to a pattern of all zeroes and the second pattern corresponds to a pattern of all ones.

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16. The method of claim 3 wherein the at least one type of code constraint violation includes code constraint violations that include patterns of all ones, all zeroes and alternating ones and zeroes.

17. The method of claim 1 wherein each data block includes w-bit data symbols and one or more of the data symbols include code constraint violating symbols having code constraint violating bit sequences of w bits.

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18. The method of claim 17 wherein the linked list includes a forward list.

19. The method of claim 18 wherein replacing comprises:

replacing each of the code constraint violating symbols in the data stream with a pointer value, all but a last one of the replacement pointer values pointing forwards to a location of a next one of the code constraint violating symbols occurring later in the data stream and the last one the replacement pointer values comprising an end-of-list marker; and

providing a head pointer value to point to a first one of the replacement pointer values.

20. The method of claim 19 wherein the head pointer value is prepended to a first of the data symbols in the data block.

21. The method of claim 17 wherein the linked list includes a reverse list.

22. The method of claim 21 wherein replacing comprises:

replacing each of the code constraint violating symbols in the data stream with a pointer value, all but a last one of the replacement pointer values pointing backwards to a location of a

next one of the code constraint violating bit sequences occurring earlier in the data stream and a last one the replacement pointer values comprising an end-of-list marker; and

providing a head pointer value to point to a first one of the replacement pointer values.

5 23. The method of claim 22 wherein the head pointer value is appended to a last of the data symbols in the data block.

24. The method of claim 17 wherein each data block includes w-bit data symbols and one or more of the data symbols include code constraint violating symbols having code constraint
10 violating bit sequences of $m \leq w$ bits.

25. A method of decoding a codeword comprising:
receiving a codeword that includes a linked list of pointer values each associated with a pattern of code constraint violation; and
15 parsing the codeword, removing a first one of the pointer values and replacing each subsequent pointer value with the pattern of code constraint violation with which such pointer value is associated.

26. A method of processing data comprising:
20 encoding a block of data by modifying the data block to produce a codeword which includes a linked list of pointer values, each of the pointer values being associated with a pattern of code constraint violation; and

decoding the data block by parsing the codeword, removing a first one of the pointer values and replacing each subsequent pointer value with the pattern of code constraint violation with which such pointer value is associated.

5 27. An article comprising:

a storage medium having stored thereon instructions that when executed by a machine result in the following:

receiving blocks of data in an unconstrained data stream; and

10 producing a constrained data stream to satisfy a code constraint by replacing code constraint violating bit sequences occurring in each data block with values that form a linked list in such data block.

28. A system comprising:

a data channel;

15 an encoder unit, connected to the data channel, including a modulation encoder followed by an error correction code (ECC) encoder; and

the modulation encoder being configured to receive blocks of data in an unconstrained data stream, and to produce a constrained data stream to satisfy a code constraint of the data channel by replacing code constraint violating bit sequences occurring
20 in each data block with values that form a linked list in such data block.

29. The system of claim 28 wherein the values include non-code-constraint-violating pointer values.

30. The system of claim 29 wherein the replaced code constraint violating sequences of bits include at least one type of violation of the code constraint.

31. The system of claim 30 wherein the code constraint includes a k constraint.